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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/729,816	12/06/2000	Takuji Matsumoto	200504US2	6963

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EXAMINER

OWENS, DOUGLAS W

ART UNIT PAPER NUMBER

2811

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/729,816

Applicant(s)

MATSUMOTO ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 7, 15 and 21 is/are rejected.
- 7) ☒ Claim(s) 2-6, 8, 16-20, 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 17, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,320,234 to Karasawa et al. in view of admitted prior art and US patent No. 5,726,499 to Irinoda.

Regarding claim 1, Karasawa et al. teaches a semiconductor device (Fig. 1) comprising:

a substrate (10) having a first active region (16) of a first conductivity type and second active region (18) of a second conductivity type, the first and second active regions being disposed in a semiconductor region;

an isolation insulating film (20) between the first and second active regions;

a first interlayer insulating film (66) on the first and second active regions and a surface of the isolation insulating film;

a second interlayer insulating film (74) on the first interlayer insulating film; and
at least one wire on the second interlayer insulating film (Col. 6, lines 65 – 66).

Karasawa et al. does not teach using an oxide for the first and second interlayer insulating films. Oxide is commonly used in the art as a material for interlayer insulation layer. It would have been obvious to one of ordinary skill in the art to use an oxide, since it is a known material that is well suited for the intended use. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Karasawa et al. does not teach a silicon nitride layer on the first interlayer insulating film. Irinoda teaches a silicon nitride layer between layers of interlayer insulating film (Fig. 11; 512, 612). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the nitride layer taught by Irinoda into the device taught by Karasawa et al., since it is desirable to prevent unwanted diffusion of impurities, prevent penetration of moisture and control etching of the contact holes.

Neither Karasawa et al., nor Irinoda teach an SOI substrate. Admitted prior art teaches an SOI substrate (Fig. 22). It would have been obvious to one of ordinary skill in the art to incorporate the use of an SOI substrate since it is desirable to reduce parasitic capacitance, thus increasing device operation speed. If the proposed

modification were made, the resulting device would have further had a first semiconductor region between the isolation insulating film (20) and the surface of the insulative substrate.

Regarding claim 7, Karasawa et al. does not teach a device, wherein the silicon nitride film includes a silicon nitride film formed entirely on the first oxide except where contact holes are formed. Irinoda teaches a device, wherein the silicon nitride film is formed on the interlayer insulating film except a portion where contact holes are formed. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Irinoda into the device taught by Karasawa et al. for reasons discussed above.

4. Claims 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,362,508 to Rasovsky et al. in view of admitted prior art.

Regarding claim 15, Rasovsky et al. teaches a semiconductor device (Fig. 1) comprising:

- a semiconductor substrate (102) having a first active region (105) of a first conductivity type and a second active region (103) of a second conductivity type;
- an isolation region (FOX) between the first and second active regions;
- a silicon nitride film (130; Col. 3, lines 47 – 48) on the first and second active regions and a surface of the isolation film;
- an interlayer insulating film (140) on a surface of the silicon nitride film; and
- at least one wire (160-2) on the silicon nitride film.

Rasovsky et al. does not teach an SOI substrate. Admitted prior art teaches an SOI substrate (Fig. 22). It would have been obvious to one of ordinary skill in the art to

incorporate the use of an SOI substrate since it is desirable to reduce parasitic capacitance, thus increasing device operation speed. If the proposed modification were made, the resulting device would have further had a first semiconductor region between the isolation insulating film (FOX) and the surface of the insulative substrate.

Regarding claim 21, Rasovsky et al. teaches a semiconductor device, wherein the silicon nitride film includes a silicon nitride film entirely formed on a main surface of the semiconductor layer, except a portion where contact holes are formed.

Allowable Subject Matter

5. Claims 2 – 6, 8, 16 – 20 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach an impurity region of the first conductivity type formed in the second active region and being electrically connected to the region between the first source and drain region.

Response to Arguments

7. Applicant's arguments with respect to claims 1 – 8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

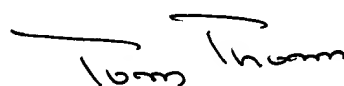
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO
May 27, 2003


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800